## Menlo Park Notebook #88 [N-79-08-28]

This notebook covers the period January 1880-January 1881. Most of the entries are by Albert B. Herrick. There are also a few entries by other laboratory assistants. The first part of the book contains a record of street lamps at Menlo Park during January 1880. Following this are many pages of miscellaneous calculations along with a few drawings of lamps, generators, and other devices; notes on chalk cylinders; and drawings and dimensions of a Porter-Allen high-speed engine. There are also three draft letters by Herrick, two relating to telephone orders and installations and one about a vacuum pump order. The label on the front cover is marked "Herrick." The first page is inscribed: "Sworn in Evidence Ashcroft - Justice Peace NY City." The book contains 282 numbered pages and has been used in both directions. The pagination is irregular; some numbers are used for more than one page.

Filming order: pp. 1-243, 282-260 [in reverse page-number order].

Blank pages not filmed: 172-173, 176-177, 184-185, 218-233, 238-241, 244-259.

Missing page numbers: 201-202, 247-248.

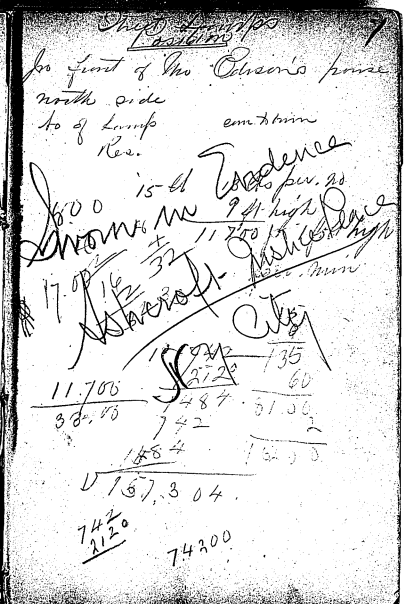
LIBRARY OF THE

BOARD OF PATENT CONTROL,

120 BROADWAY, NEW YORK.

GENERAL ELECTRIC.

_____, 189_.



2

$794 : 1 :: 19X$

$19 \overline{)794} \left(41\tfrac{15}{19}\right.$

76

34

19

15

$795 - 1/2 C.$

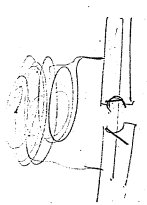
$795 - 1/2 \text{ of } \frac{1}{795 - H}$

$\frac{1}{1590}$

$3180$

For front of Edisons
House south side
No of Lamp
Res.

cons & town



No Lamp-post at corner of
Mr Edisons yard

No of Lamps conn. to Junc
Rec

Ground E 4 in across end
Iron post- rests 1 end of stock
5.25 in

Total depth 20 in + Thickness
of Clay

Opposite Mar Baladeus

House Lumps - post Ann Thomas

No of Lumps

Res.

Jon Street Lamps Below 8

Mrs Jordans

Roof Lamps

Ken.

Jean Hamm

9

Jas Lamsfasit by Adams 18

Ato of Lumb Rec

Con Sum

66 × 66 = 396 + 396 = 4356

50 × 56 = 14 × 14 = 196 + 196 = 1960

196 / 4356 (22 × 2 = 44 22/49)

392

436

392

44 11/49

196

Start Jump: month ends 2

Office

No of Jumps Nos

Cam. & Comm

H.W. 1c ... high ... height to 1.05m

L.H.W. 24

L.K.W.S. 3.5

length from 6.91

height - jump from track

width ... & ...

Ride ... 6/20

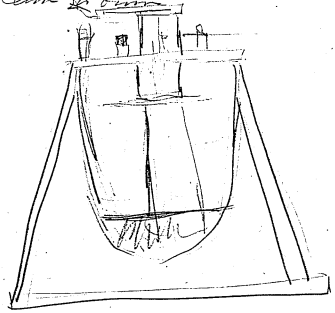
Size ... 2

... height -

length

Ref

Street-Lamp Oonth oilly
Office
Pos of Lamp Res.
Cem 4 bum



Agents Benjamin

14

Of

Interpolation

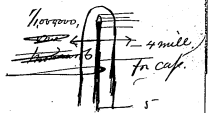
Inversely

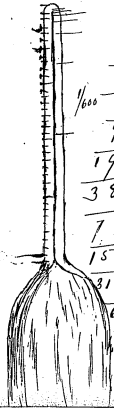
4185-4800
4185-0007
479.3 Tot diff
between
Inner and Major
axes

Worked

Street-Lamps between Lab. and Office

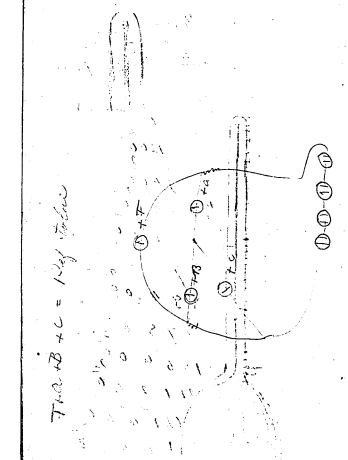
As of Lamps Rev.



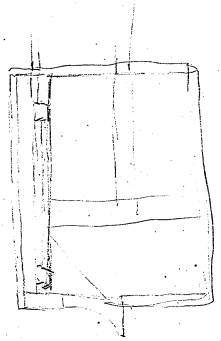
600
1200
2400
4800
9600
19200
38400
77800
155600
311200
622400
1244800

6

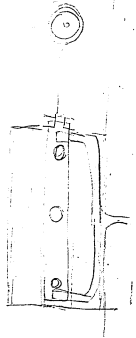


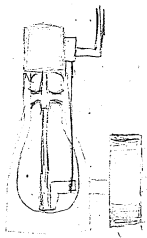

7

Street Lamps between
Lab. and Phys
No 8 Lamps Res.
Commenced 8 hours



Sheet-Lamp of copper
for marine Ships
Etc. Lamps &c.
Cerm. to burn





Sheet – Lamps at Corner
of Lab. Yard
No. of Lamps
Corn. Burned

Nobody's
you are a stab
you cannot
Buried under stairs
I shall see

Foot of stairs May 28 1880

22

$x$ = first No 5

$4x$ = second No 20

$3x = 15$ third No 15

$6x$ = fourth No 30

$x + 4x + 3x + 6x = 70$

$14x = 70$

$x = 5$

$x$ = eldest 15

$4x$ = [illegible] 60

$x + 4x = 75$

$5x = 75$

$x = 15$

Street lamps between corner 30
and Cab. guided

No of Lamps Res.

Case to learn

$x$ = first-fourth 12

$2x$ = second " 24

$3x - 15 =$ third " 24

$x + 2x + 3x - 15 = 57$

$x + 2x + 3x = 57 + 15$ 36 / 15 / 21

$6x = 72$

$x = 12$

---

$x$ = eldest-[illegible] left- after 1-
$x - 3$ eldest left after 1 tav.
$\frac{1}{3}(x - 3 - 9)$ " " " 2 "
$x - 3$ [illegible]

$3x - 9 - 27 = x$ 12 / 9 / 3

$x + 3 + x - 9 = x$ $x = 15$

$x + x - x = +3 + 3 + 9$

24

$10x = 20$

$\frac{x}{5} - \frac{x}{2} = 3$ $\qquad$ $\frac{x}{2} - \frac{x}{5} = 3$

$x - x = 30$

~~$x = 30$~~

$x$

$5x - 2x = 3$

$3x = 3$

$x = 1$ $\qquad$ 10 and 5 = 2

$\frac{16x^2 \div}{8x}$

$8x \overline{)16x^2} \; (2x$

$-12a^2x \overline{)36a^3x^2} \; (-3a^1x$

$36a^3x$

~~$0 = 8a \quad 36 =$~~

At corner of Plank Walk.

At ~~4~~ Jump Res.

Commenced to run. Res.

$x$ = Lemons

$y$ = oranges

$x = y$ $\qquad$ $x = 2$

$2$ $\qquad$ $2 \times 2$

$2x + 3x = 80$

$5x = 80$

$x = \frac{16}{10}$ of each

32

28

160

74

800 cents

26

$29a^2b^4c^6 - 58a^3b^3c^2d^2 - 2ab^2cd^2$

$\frac{x+a}{6} - \frac{c}{d}$

$\frac{dx+da}{6d} - \frac{cd}{6d}$

$dx + da - cd =$

$= 2dx a - cd$

$\frac{3x+a}{5} - \frac{2x+y}{8}$

$\frac{24x+8a}{40} - \frac{10x+35}{40}$

$24x+8a - 10x+35$

$40$

Jno Lamb-post between Thomas's Stable and corner of walk etc of Lamb. Res Com. & Guild

4

$24x$ = days worked

$-12x$ = days idle

$24x - 12 = 504$

$x$ = days work

$y$ = Idle days

$x + y = 504$

$24x$ = what he earned for

$12y$ = what he paid for

$24x + 12y = 504$

$x + y = 48$

28

$24x = 504 - 12y$

$y = 48 - x$

$24 \overline{)504} \; (21$
$48$
$24$
$24$

$12y = 504 + 24$

$12 \overline{)482} \; (41/4$
$48$
$2$

29

Steel-Lamp instrument of
Thomwalts Stable
No of Lamps Rec.
Com. Dollars

Wyoming.

Geo Carman

Utah

Sa Edison

From Cat

30 474

Gen

An effect is caused along the nerves at the rate of 93 feet per second

3830 6207 3076
7066 5402 574
6676 6204 7063
7078 3460 7843
3076 3820 4764
3375 3988 4304
4067 2490 401
4076 5366 47644
9870 3208 232
4780 3760 3207
3176 3436
5687 5876
3264 5876
3220 5876
3824 3490

Street Lamps by aptera 31

Number of Lamps

Cum Number

Nos.
4240
3220
3067
3268
3280
3200

Steel-Lamps at corner
of Boston Jane
No of Lamps 739 Nos. 1144
Commenced burning Feb. 26
1880
Miami 6186 St. Louis

3.4

176

$36a^4b^6c^8$

$-2a^4b^4c^6d \;/\; 144a^9b^8c^7d^5 \;(-4a^5b^4c^4d^4$
$144a^9b^6c^7d$

$-4a^4y^3 \;/\; 12a^4y^6 - 16a^5y^5 + 20a^6y^4 - 28a^7y^3 \;(3y^3 - 4ay^2 + 5a^2y - 7a^3$
$12a^4y^6$
$-16a^5y^5 + 20a^6y^4 - 28a^7y^3$
$-3y^3 + 4ay^2 - 5a^2y + 7a^3$

$6ax^6 + 6axy^6 + 42a^2x^2 \;/\; ax + 7ax$
$6ax^6$
$6x^5$

Steel Lamp south side

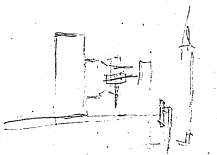
Up Down Left Right

No of Lamps 5/3 Pcs

Conv. & turns

7+4.3 12

3 2 2



$6ax^6 + 5ax^6y^6 + 2a^2x^2 \;/\; ax + 5ax$
$5ax^6$ $5ax^6$
$x^5$

June 16 1880

Entrance Turnin

4

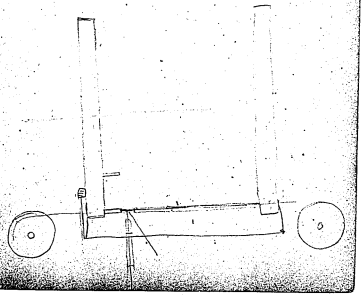
Steel Lamp north side 87

top of Stairs to Chapel —

No. of Lamps 352 Res. 122

Com. Burning Lamps June 10. 1880

broke March 5. 930 hours



38

39

If you cannot-
talk united States
idems and shake
hands you
he will right speak
to you

Yat

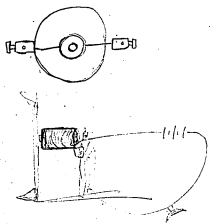
Obama shake hands

Texas
everybody knows
your pet name

début sample du ~~Prélèvement~~ dentier

to

base



67 19

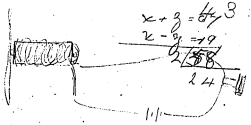
x = 43
y = 24

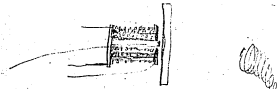
x + y = 67
x + 19 = 19
2 2 18 6

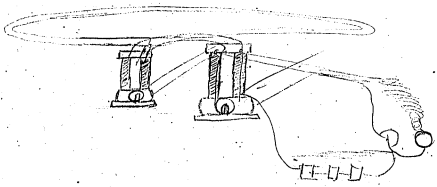
x + y = 67
x - y = 19
2 2 48
24

67
43
24
48

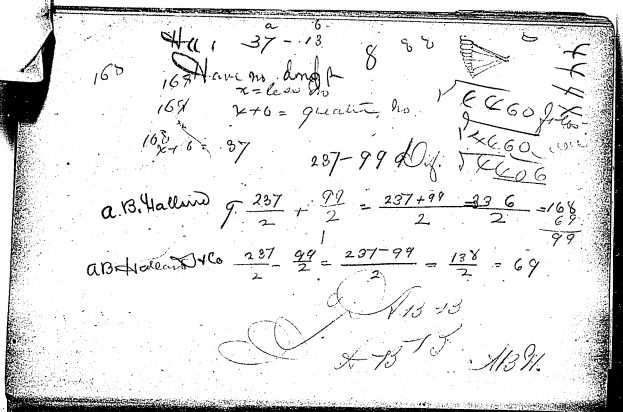
67
24
43
2

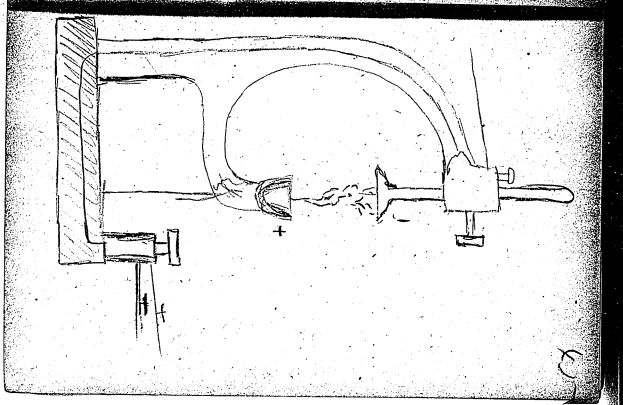






Two Engines 40 20
1 Engine of combine 1/8 inch thick
One Engine 1/16 inch thick


a
b
37 - 13
x = less no
x+6 = greater no
x+6 = 37
237 - 99
a.B. Halleck
237/2 + 99/2 = 237+99/2 - 99 6/2 = 168/2 = 84
99
a B Halleck & Co
237/2 - 99/2 = 237-99/2 = 138/2 = 69
A13-13
A-13-13
A1391.


+
-

22 Inches metres long
2 millimetres dia.
26.° Centigrade

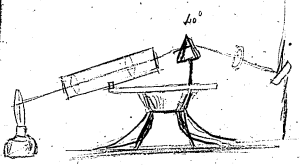
$7a^2b - 9ab^2c - 9a^2b^2 - 9ab^2c + 3c^2 + 9d^2$
$-5a^2b^2 + 8ab^2c - 4b^2c + 3c^2 + 2d^2$
$4ab^2 - 5a^2b^2 + 9b^2c$

$6ab^2 - 9abc - 3b^2c$

3 a .0127 Inches
22
0254
0254
.279400

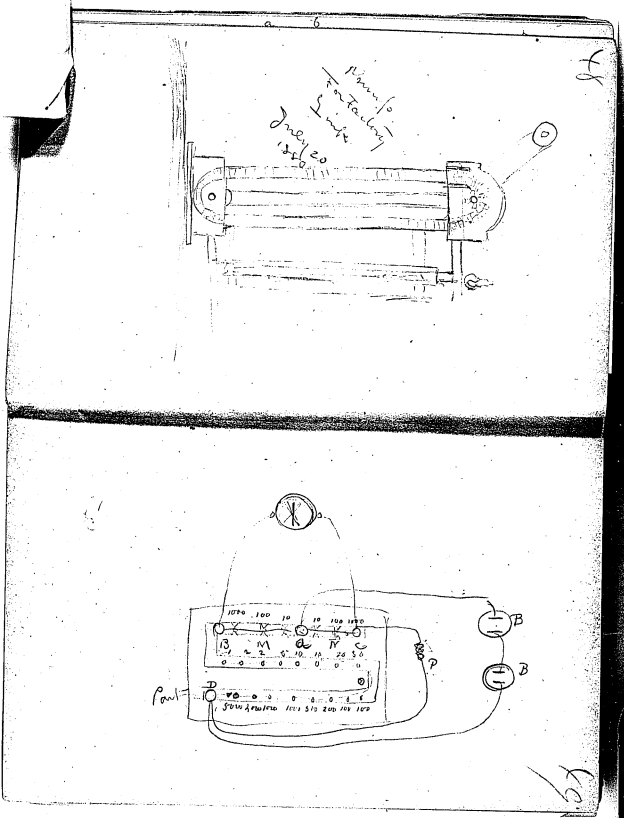
4 inches

.06988 Res
0998
.06565 Things
.0038
26
0228
0076
14.07538




60 feet
32
28

$51a^3b^2c - 18abc - 14a^2y$
$41a^3b^2c - 27abc - 14a^2y$
$10a^3b^2 \quad 9abc$
$5a^2 \quad 1$



$5a^4 - 7a^3b^2 - 3c^5d^2 + 7d$
$3a^4 - 9c^2 - 7c^5d^2 - 5b^5 - 3a^2$
$-15a^3b^2$

$2a^4 + 8a^3b^2 + 4c^5a^2 + 7d + 9c^2$

cm.

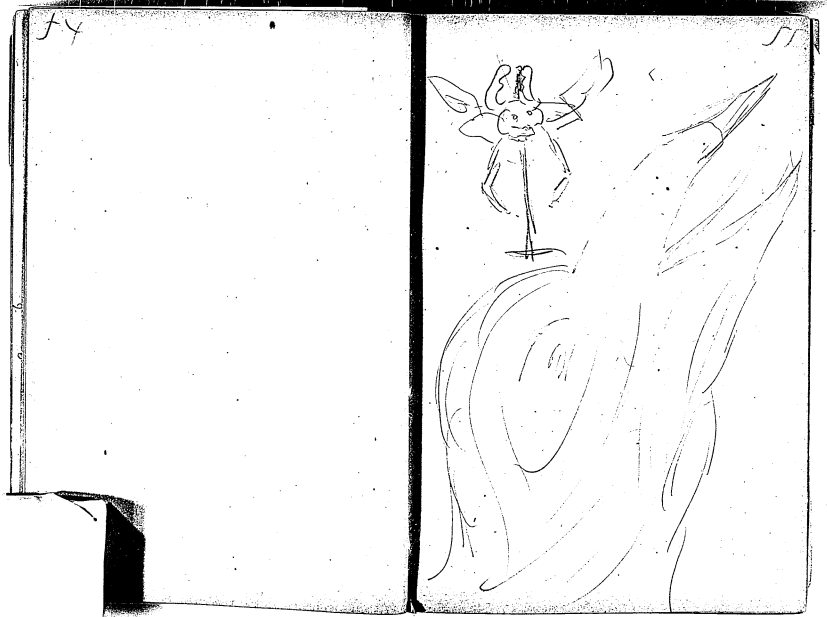
Semi merke Lagnes
Brue ~~corrthus~~
$= dac = 12$
2ue.

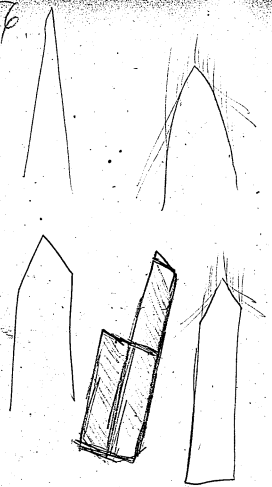
$2a^2 - 3ax + 4x^2$
$5a^2 - 6ax - 2x^2$
$+10a^4 - 15a^3x + 20a^2x^2$
$-12a^3x + 18a^2x^2 - 24ax^3$
$+4a^2x^2 + 6ax^3$

$= 10a^4 - 27a^3x + 24a^2x^2 - 18ax^3$

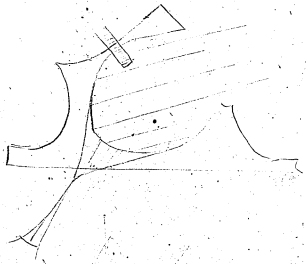
12

13





March 18. 1880 27



58

59

Precis

61

4282

2.68.1442

5.262085

888.7 — 42.24

2,948755

1,625724

1.323031

30
31 10 6
30
61
0

1,81

106. Fatma

1025306 — 20 — 506120

Ismail

2.846

45-482

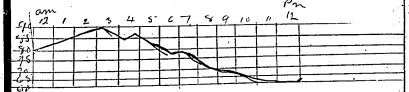
2070

60

61

105
.025306
.0126530

.00126530



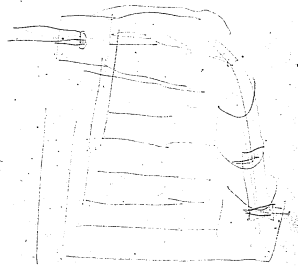

June
July 12 1806
Variation for 12 hours

62

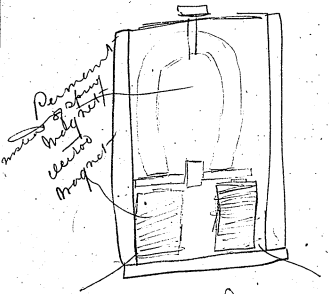
| | |
|---|---|
| 2 pair socks | 1.00 |
| 1 pair shoes | 2.50 |
| 1 pair suspenders | .75 |
| 2 pair drawers | 1.50 |
| 1 undershirt | .25 |
| pair Thermometer | .35 |
| for papers | ~~.20~~ |
| for Soda Water | .25 |
| | 7.10 |
| | .75 |
| | 8.55 |

10.00
7.70
2.30

10.00
8.55
1.45



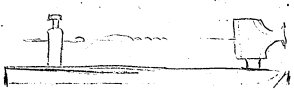


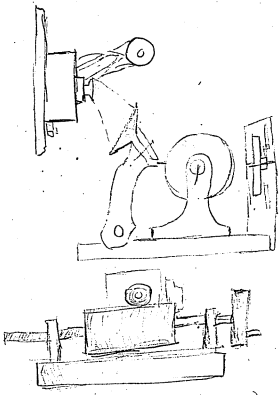



Patented by Johnson
June 1865

O.K.

Platinum wire .001 thick to wiring





Phonograph and connection with Long speaking telephone

70

45·2789

655·810
77
9
655896 kof.

3 5 3 8 6 7 2 3.345678
5574
78
88
1.0

1·9946455 98.7655
4551
24
22
2.6 Dog

6·345670
5·570
1·05
.22165

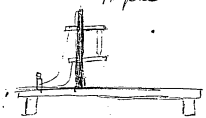
108
98
240
5

3·538672
8574
98 345678 5

1.647817
7774
42
94
1.40

12

73



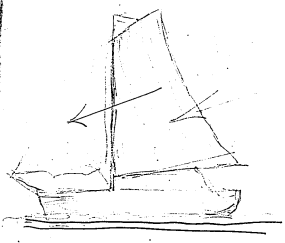

Microphone

Hammer head
amorphous

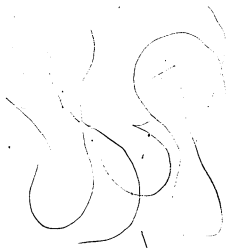
Printed Circuit

74

71

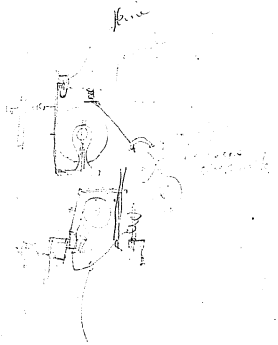


Tattoo in Progress



| height | heavy |
|---|---|
| Onlooker 1 | Artist 3 |
| Artist 1 | Artist 3 |
| Artist 2 | Artist 3 |

Helpful for participating



80

9.73345

668190

9.05387

6ac + 5a[illegible]

3cc + 2[illegible]

5ac − 5[illegible] − 7c + 4c²

− c

− 7c + 4ac

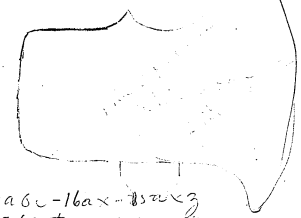
16a² − 56c + 7ac

− 14a² − 5c + 4ac

2a² − 7c + 11ac

81

1/4



19abc − 16ax − 85xz

− 17abc + 7ax + 15xz

2abc − 23ax + 100xz

84

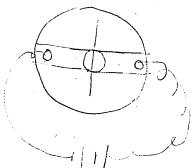
21

63

64 49

47

1

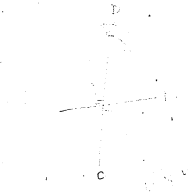


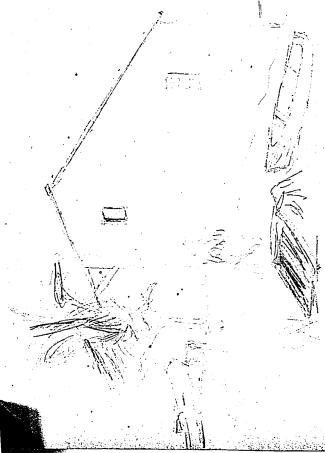
Bubble between two plates

[illegible] of water

Broda also found between parallel plane as the resistance would increase and diminish with lengthening and shortening of [illegible] of water as cross section is reduced

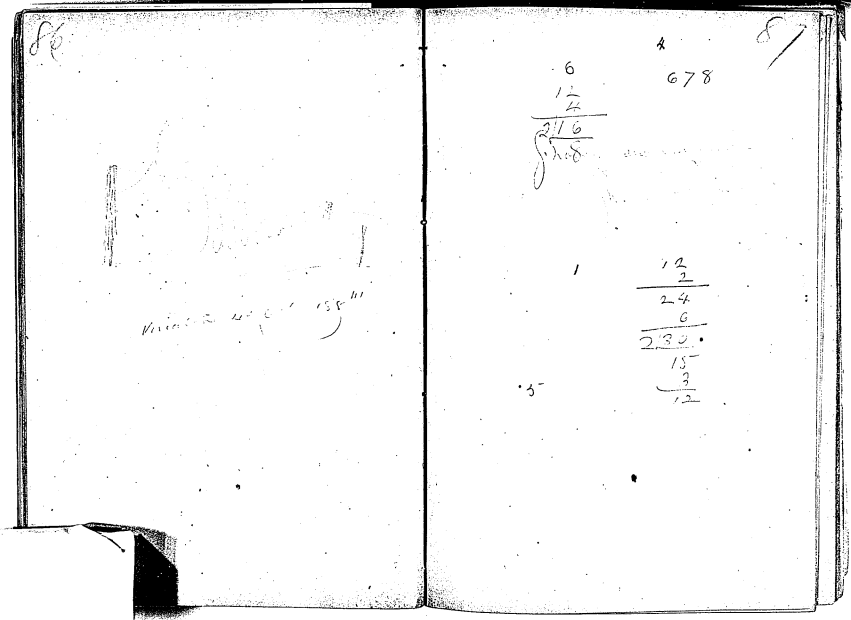
experiment did not succeed under [illegible]







63
19
19
57
6
6



86

$\frac{x}{2}$ = Three orbs of Pearls

$\frac{x}{4}$ = " " 1200.

$\frac{x}{7}$ = Guinea

3 = Yearly

$\frac{x}{2} + \frac{x}{4} + \frac{x}{7} + 3 = x$

$2x +$

$54x + 168 = 56x$

$56x - 54x = -168$ $6x = 168$

28

14 8/3
12 1/3

14

| | | |
|---|---|---|
| 12 | 12 | |
| 1 | 1 | |
| 13 | 13 | 6 |
| 5- | 5- | |
| 65 | 65 | 5 |
| 7 | 35 | 30 |
| 72 | 5- | |
| 8 | | 12 |
| 80 | 1/2 | 3 |
| 2 | 144 | 86 |
| 160 | 1 | 1 |
| 1 | 145 | 87 |
| 161 | 5- | 3 |
| 5- | 725 | 111 |
| 805 | | 12 |
| | | 123 |

678

59

90

91

4.370143

R85-5

R3450 Wan

1. 53,857 4

53 345-5

4.36.8999

4.33.36 8999
8277
122

98

6.345.678
5-120
109
22106

92

9.05585 19

9.68 3 7 / 2

16
17
98

93

2.5 3 8 6 7 2

8 8 9 4

345-98

8699
8672
27

845.6 / 2

1.9944605
4685
24

22165

9876

5.84

36
23
13

27
22

16
12
2|28
14
8
6

24
3
72
1
73
3
219
2K
243



8

16
77

1

12 14

13
2
26
8
234
17

12 8
24 16
8 8
2|192 24
16 12
4 4
12 8

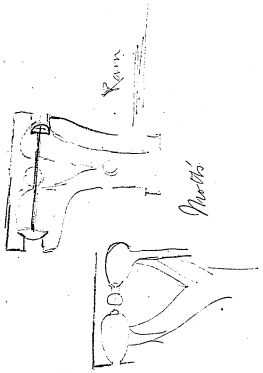
96

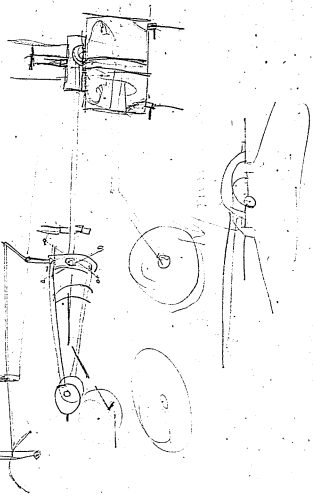
97

1

202
2
404
12
2 | 408
196
8
190

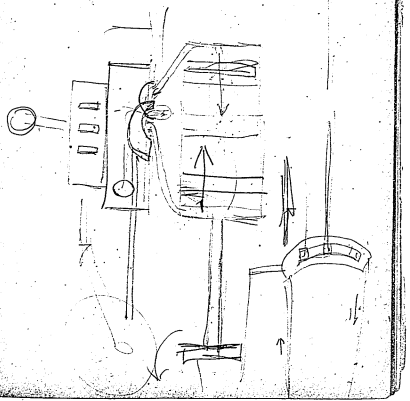
416
208
206
200

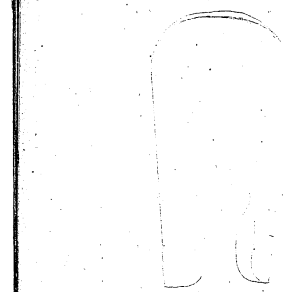

Rein
Mantle

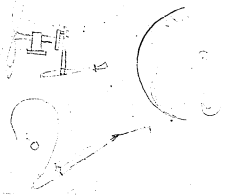




Bonnet- hinge







Practice work

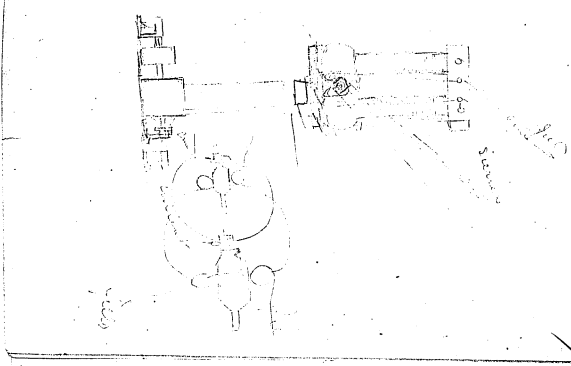
Armature coil $w^R$ $w^L$

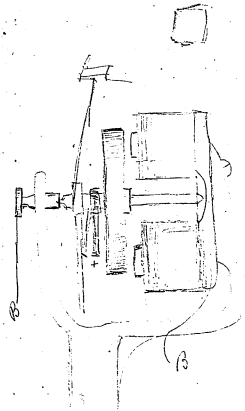
Field coils $m^L$ $m^R$

$w^R + w^L$ = [illegible]

$w^R + w^R$ = [illegible]

$m^L + m^R$ from field
Drawing [illegible] magnetism field around $m^R + m^L$








# 105000

x = 5 %

y = 4 %

x

105000

5x/100 = 4y/100

5x/100 = 4y/100 = 4500

x : y ::

5x/100 : 4y/100 :: 4500 : 0

5x : 4y :: 4500 : 0

5x = 4y = 450000

x = 450000/120

Machinery

Steam cutting Cabinet & Scroll saw

One steam engine & boiler

1000.



Bussess Business

~~Dust~~

Index machine for gears

Microphone Telephone

Phonograph & Microphone

Bell Press & Table

Book cutting machinery

Pump

Steam Pump

Machinery Foundry

Portable engine and

Speedometer

Glass Tubes

Good

Good for Tuesday evening

Tremen.

~~Try one of the experiments~~

~~to-day~~ ~~if~~ ~~you~~ ~~can~~ ~~you~~ ~~can~~

~~Saturday night~~

~~Can you come~~

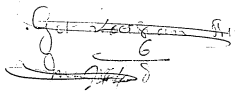
~~can come~~

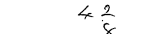
Fatima T.A.L Sup

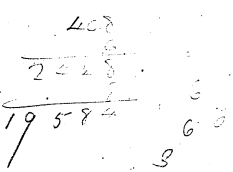
$12345 \times 6789 = 45$



Cyclic no





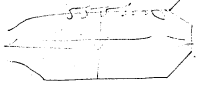


Grade

90'8 — 40'6 x

5-5 Beam

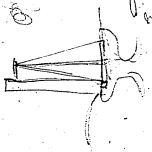
Camel back Trs. Ends



Many one Thick

Johannesburg

Dolomite



10.5 miles Jasmine

620

10.5

5 2 800
2640

624 | 5 5 4 4 0 (88)
4 9 6
5 8 4
5 8 8
88
62
25
62

8 90 cords
2.00
180.00

3 1/2
15
10 1/2
40
640
20
600
8
5 2 0 0
2 6 0 5



Experimental apparatus
all kinds of Laboratory
apparatus

Private telephone
lines erected and put-
in working order at
least cost price

11.13 Electrical Engineer

Burgess Power Co.

Roselle

J. G.

4
2440
4
90 | 10566
11
3
451

45 1
180
40

20
20
40

671.40

$x + 19$ = greater

$2x + 19$ = sum

sum = 67

$2x + 19 = 67$

$2x = 67 - 19$

$2x = 48$

$x = 24$

If the sum of two nos. & their diff. is known the greater no. can be found by adding ½ of the diff. to the less no. & the less no + 19 = greater no.

$x + 19 = 24 + 19 = 43$

$43 + 24 = 67$

$43 - 24 = 19$

$a + \quad - \quad b$



$7abc^2 - abc^2$

$-7abc^2 - 8abc^2$

$+6abc^2$

$-8abc^2$ ans

$x$ = first no

$y$ = second no

$x + y = 67$

$x - y = 19$

$2x = 86$

$x = 19 + y$

$x = \frac{19 + y}{1}$

$x = 43$

$x + y = 67$

$x - y = 19$

$2y = 48$

$y = 24$

$x = 67 - 24$

$43$

$x = 43$

$y = 24$

$67$

$x + y = 67$

$x + 24 = 67$

$x = 67 - 24$

$x = 43$

$y = 24$

122

$x$ = original number he used at first

$\frac{x}{4}+3$

$\frac{x-\frac{x}{4}+3}{3}=12$

$\left(x-\frac{x}{4}+3\right)\frac{1}{3}$

$12x-(3x+12)=144$

$\frac{\frac{x}{4}+3-\frac{x}{4}+3}{3}=12$

$\frac{3x}{4}+9-\frac{x}{4}+3=36$

$3x+36-x+12=144$

$3x-x=144-36-12$

$48$

$x-\frac{x}{4}+3$

$\frac{x-\frac{x}{4}\times 3}{3}=12$

$3x-\frac{x}{4}+3=36$

$12x-x-12=144$

$11x=132$

$x-\left(\frac{3x}{4}+3\right)=12$

$3x-\frac{3x}{4}+3=36$

$\frac{15}{3}$

$\frac{18}{6}$

$6:18$

$8$

$2$

$12$

$4$

$x-\frac{x}{4}+3$

$x-\frac{x}{4}+3$

$x-\frac{\frac{x}{4}+3}{3}=$

$x-\frac{x}{4}$

$\frac{3x}{4}+3$

$x-\frac{\frac{3x}{4}+3}{3}=12$

$\frac{3x}{4}\div\frac{2}{3}=36$

123

$y$ = greater no

$x$ = less no

$\frac{y+x}{2}+\frac{x-y}{2}=y$

$\frac{x+y}{2}-\frac{x-y}{2}=x$

$y+x+y=2y$

$x+y-x-y=2x$

$2x=2y-y+y$

$2x=2y$

$y+x=y$

$y+y=x$

$x+y=y$

$2x+y=2y$

$2x=2y-y$

$188$

$x=94$

$x+y=$

$64+y=137$

$y=188$

$64$

$188$ ans.

$x-\left(\frac{3x}{4}+3\right)=12$

$3x-\left(\frac{3x}{4}\right)+9=36$

$12x-3x+36=144$

$y-\left(\frac{3x}{4}+3\right)=12$

$12x-3x-36=144$

$9x=180$

$x=20$ ans

Mear Sir

Receives yours
21. & must and made a
rough calculation on your
proposition which ariles and:
to £671.42 every thing in
working order The Lunes
Sems yours ~~[illegible]~~.

Yours
A.B Furnell
Esqr
Rosetta Mg.

Giving views for working
Ann: Wapish Mr. Mitchel-
which will work that drobing

$7x + 3ab + 2c$
$-3x + 3ab - 5c$
$5x - 9ab - 9c$

$9x - 3ab - 12c$

$16a^2b^2 + bc - 2abc$
$-4a^2b^2 - 9bc + 6abc$
$-9a^2b^2 + 6bc + 4abc$

$3a^2b^2 - 7bc + 5abc$

$2a + ab + ab = 3b$

$\cancel{5ab} + \cancel{\quad} + a - 3 + x$

128

14 stocks at Rs 15/-

800

(800) 4 : 4 (1

4200

7

6

@ 14 and 6 [illegible]

[illegible]

[illegible]

14

10 75 [illegible]

30 [illegible]

5-8 [illegible]

129

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

D = 40"

M = 75 Rs

Dia. 40" = 1.66

40" = 3.14 × 40 = 125.60

P = 3.14 × 40 / 75 = 75 / 125.60 (1.66

75 / 9420 (

75 / 192

75

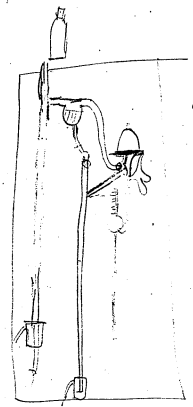
450

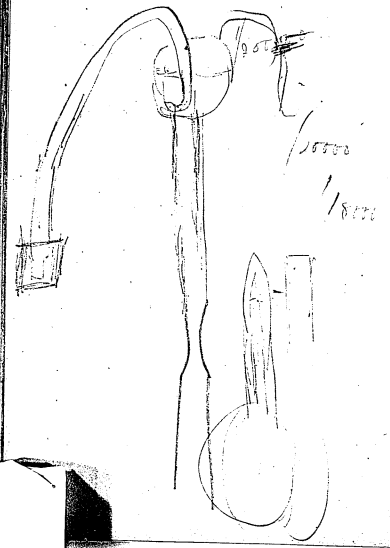
450

00

450

Lamp

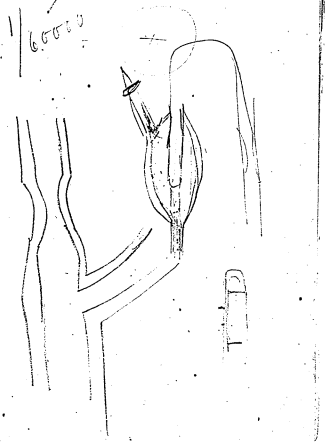






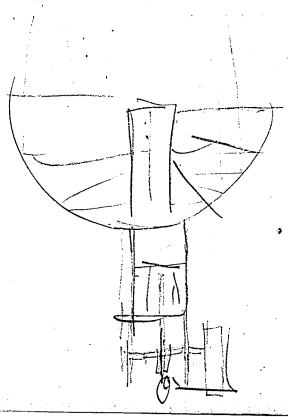
48 1/1500000

47 1/6500



E

Evaporation sur Table



136

4 | 144000 | 1 10/11
33 | 360 | 33
1440 | 33
2
33 | 1440 | 10/11
1
720 | 3 1616 | 3
3 | 945 48
3

9.45 39 m
80
720
440
608 3
115 20
8640
4 | 875520
33 | 218880 | 83
190000
19 8 5 5
33
200 | 2388 | 72
32

137

Porter Allen & Sons

Light Upright Engine

Cyl. 3 x 5
Stroke 3 in
1 in Pressure 80 lbs
Speed 600 Revs
Horse power
6 9/10 Brake h.p.
100 Revs 1 13/17 h.p.
200 " 2 2/17
300 " 3 15/17
400 " 5

15 25

16

Width Cylinder 6 9/16 Width of the piston
Height Cylinder 9 1/2 mm
6 9/12 Width valve
6 3/12 "
12 3/12
9 9/12
4 3/12
26 3/12
1 9/12 diam of crank shaft
6/12 diam of
7/12 diam
4 4/12
width of
diam
connecting

length of crank 5 3/12 whole stroke 10 2/12
width bodies of 1/2 8 length 5/12
outside diam of
Diam of valve rod 5/24
diameter
diameter
diameter
diameter
length of
diameter of
1/2 1/2 diam
1/2 1/2 of bolts
1/2 1/2

Eccentric collar 7/24

[illegible] collar 9/12

Middle fly wheel web 8/12

[illegible] 7 7/12

[illegible] shaft -

Middle of stroke [illegible]

" " 1 4/10 [illegible] -1

" " -1 8/12 dia from collar [illegible]

distance from [illegible]

Lower ring on collar 7/12

1 4/12

1 11/12

small rim inside of large rim

Distance between [illegible] 5/12 and [illegible]

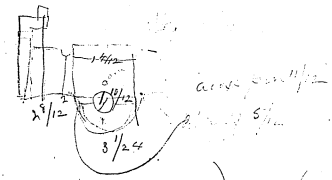
for [illegible] 5 [illegible] Keys

4 1/2 x 4 1/2

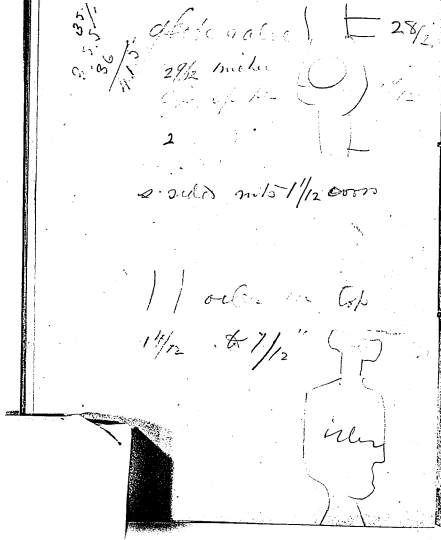


Rod holding [illegible] 5 1/12

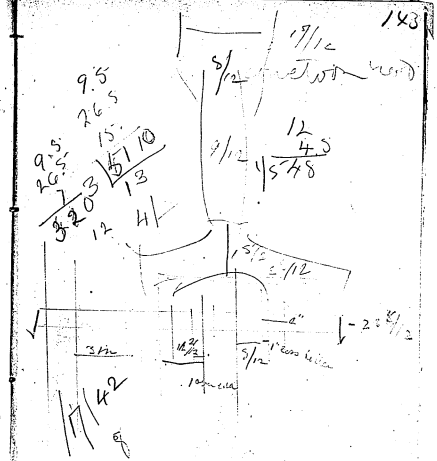
Cross head



142



143



1/5 of 1/2

3/2 × 1/5 = 3/10

9 1/2

4 1/5 +

19/2 × 1/5

1 1 9/10

1/5 of 6 6/10

66/10 ×

1/5

66/50

5 2/2

12

1 16/50

25

Piston Cylinder. at rim 6 0/10 — 1 16/30"
" " over wood 6 5/20 — 1 1/4"
Upper rim width 1 1/2 — 3/10
Upper " smallest width 3/4 — 3/12
Lower rim outside 1 1/2 — 3/10
ring inside Lower rim 3/8 from Top — 3/10
ring 3/2 wide — 9/60
Piston valve box — 1 7/16 6 4/12
Width of frame from cylinder 6 7/12 — 1 7/30
Widest bulge in frame 12 3/12 — 2 29/60
Narrow Waist bulge 9 13/12 — 1 29/30
Width of top - wheel 4 3/12 — 5-1/60
Rim of " 26 — 4 4/5
Diameter of crank shaft - 1 9/12 — 7/30
eccentric sheave - thickness 6/12 — 1/10 + 7/60
C° " " from shaft - 1 9/12 — 11/30 + 7/60
Rim of piston rod 7/12 - 7/60
Across cross head 4 4/12 2 6/30
Length from shoulder 2 8/12 — 8/15
Width at plate where piston rod is screwed in 1 4/12 — 4/15
Thickness across plate at pin 1 10/12 — 11/35

Clearance between crank rod fork & eye in 9/32

Width the throw-fork-of Cedar and crank 2"

Diameter of connecting rod pin 1 1/12

Length of crank 2 1/2 $\frac{BC}{10} = \frac{1}{2}$

Width of crank $\frac{1}{10}$

Diam of valve rod 7/16

Diam of the steam guard above 1 7/12

" " exhaust " 1 3/4

Eccentric collar 11/16

Fly wheel collar 9/12

Width fly-wheel arm 8/12

Length of spokes 7 7/12

Width spokes rim next 1 5/12

Width spokes rim end 1 5/12

Width the throw fork arm 1 5/12

Two fork collars 1 7/12 measured

mid throw collar 1 1/2



$1\frac{1}{2}$

$\frac{D}{2} \times \frac{1}{5}$

$\frac{3}{10}$

$1\frac{3}{12}$

$\frac{5}{12} \times \frac{1}{5}$

$\frac{15}{60}$ $\frac{1}{4}$

$\frac{3}{12}$

$\frac{1}{5}$ of $\frac{1}{2}$ is $\frac{1}{10}$

$\frac{1}{5}$ of $\frac{1}{10} = \frac{1}{50}$

$\frac{1}{5}$ of $\frac{2}{10} = \frac{2}{50}$

$\frac{5}{8}$ of $\frac{3}{6}$

$\frac{66}{10} \times \frac{1}{15}$

$\frac{66}{50}$

$1\frac{16}{50}$

$6\frac{5}{20}$

$\frac{125}{20} \times \frac{1}{5}$ $\frac{3}{20}$

$\frac{1855}{1000}$

$1\frac{855}{1000}$

$1\frac{1}{4}$

$\frac{9}{12}$ 5

$\frac{9}{60}$

$\frac{3}{8} \times \frac{9}{5}$

$\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$ $\frac{6}{5}$ $\frac{7}{5}$ $\frac{8}{5}$

$+ 1\frac{1}{5}$ $1\frac{2}{5}$ $1\frac{3}{5}$ $1\frac{4}{5}$

$\frac{1}{12} = \frac{1}{60}$

$\frac{2}{12} = \frac{2}{60}$

$\frac{3}{12} = \frac{3}{60}$

$\frac{4}{12} = \frac{4}{60}$

$\frac{5}{12} = \frac{5}{60}$

$\frac{6}{12} = \frac{6}{60}$

$\frac{7}{12} = \frac{7}{60}$

$\frac{8}{12} = \frac{8}{60}$

$\frac{9}{12} = \frac{9}{60}$

$\frac{10}{12} = \frac{10}{60}$

$\frac{11}{12} = \frac{11}{60}$

$\frac{12}{12} = \frac{12}{60}$

$\frac{4}{5} + \frac{10}{60}$

$\frac{48+10}{60} = \frac{58}{60}$

$\frac{29}{30}$



$\frac{11}{1} \frac{1}{5}$

$\frac{2}{12} \frac{1}{6} = \frac{1}{5} + \frac{5}{60}$ $\frac{8}{30} \frac{4}{15}$

1 2 3 4 5 6 7 8 9 10 11

$\frac{1}{5} \frac{2}{5} \frac{3}{5} \frac{4}{5} \frac{5}{5} = 1 \frac{1}{5} \frac{2}{5} \frac{3}{5} \frac{4}{5} 1 \frac{1}{5} \frac{2}{5}$ 12

$11:2\frac{1}{5} \; 12 = 2\frac{1}{5}$ $\frac{1}{5} + \frac{10}{60} = \frac{2}{6}$

$\frac{4}{5} + \frac{4}{60} \; \frac{48}{60}$ $\frac{2}{5} + \frac{6}{60} \; \frac{22}{60}$

$\frac{1}{5} + \frac{9}{60}$ $\frac{2}{5} + \frac{20}{60} \; 24 \; \frac{20}{60}$

$\frac{12+9}{60} = \frac{21}{60} \; \frac{7}{20} + \frac{4}{60}$ $\frac{12}{5} \; 2\frac{2}{5} \; \frac{4}{5}$

$\frac{16}{307} \; 38 \; 1\frac{1}{5} + \frac{4}{60}$ $\frac{12}{60} = \frac{16}{60}$

$= 1\frac{28}{60} = \frac{7}{15}$

$1\frac{1}{5} + \frac{2}{60}$ $\frac{1}{6} + \frac{10}{60}$

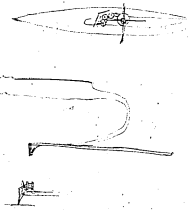
$1\frac{12}{60} + \frac{2}{60} = 1\frac{14}{60}$ $\frac{12+10}{60} = \frac{22}{60}$

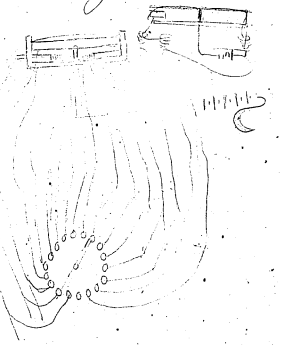
$1\frac{7}{30}$ $2\frac{3}{5} + \frac{5}{60}$

$2\frac{24}{60} + \frac{5}{60} = \frac{29}{60}$

$\frac{4}{5} \; \frac{5}{60}$ $\frac{48+3}{60} \; \frac{51}{60}$

Patien - For
Patent for
Engine Dwelling





$x$ = 1 Dia

$z$ = 2 Dia

$c$ = 3 Dia

$x + z + c = 11$

$z = 2x$

$z \quad 2x$

$2x$

$2z = x$

$2c = x$

$2c + 297 = czx$

$2c - czx = -297$

$2c =$

$xzc = 0$

$xzc + 297 = czx$

$xzc - czx = 297$

$2z = x$

$x + z + c = 11$

$2z - c = 0$

$(x+z)(z+z)x(c+z) = 0 + z + x$

$x - x + z - z + c - c = -2 + 9 + 7$

$z = \frac{c-0}{2}$

156

157

$x$ = manzanas

$y$ = peras

$c$ = bombillos

$x + y + c = 20$

$2c = x$

$c + y + x = 11$

$2c - x = 0$

$2y + xc = cy$

$xc - cy = 2y$

$c + y + x = 11$

$2c - x = 0$

$\frac{x}{3}$

$\frac{4x^2}{7} \div \frac{5x}{1}$

$\frac{4x^2}{7} = \frac{1}{5x} - \frac{4x^2}{35x}$ $\frac{4x}{3x}$

$\frac{x+1}{6} \div \frac{2x}{3}$

$\frac{x+1}{6} + \frac{3}{2x} = \frac{3x+3}{12x}$ $\frac{4x+1}{4x}$

$\frac{x}{x-1} \div \frac{x}{2}$

$\frac{x}{x-1} \times \frac{2}{x}$ $\frac{2x}{x^2-x}$ $\frac{2}{x-1}$

$4a^2b \quad -8a^2b$

$+11a^2b \quad -9a^2b$

$15a^2b \quad -17a^2b$

$-2a^2b$

$7abc^2 \quad -abc^2$

$+6abc^2 \quad -7abc^2$

$13abc \quad -8abc^2$

$16abc^2$

$-8abc^2$

$+9cb^3 \quad -8ac^2$

$+11cb^3 \quad +9ac^2 + 8ca$

$+9a-9a+cb^3$

$+ac^2 + 8ca$



$\frac{x-b}{8ca} \times \frac{4a}{3cx} \cdot \frac{xa-b}{6c^2x}$

$\frac{2}{}$

$\frac{x+1}{1} \times \frac{1-x^2}{a} \quad \frac{a}{1-x^2}$

$\frac{4x-1}{1-x} \times \frac{1+x}{1-x^2}$

$\frac{a}{}$

$\frac{ax(1+x)-x+1}{a}$

$1+\frac{ax(1+x)-1-x}{a}$

$\frac{1+x^2}{1-x^2} + \frac{1+x^2}{1+x^2} = \frac{2+x^4}{1-x^4}$

$\frac{1}{1+x} + \frac{-1}{1+x} = \frac{}{1+x}$

9

$6ac^2 - 5ab^2$
$+7ac^2 - 3ab^2 - 18ac^2$
$+18ab^2$

$13ac^2 \quad 10ab^2 - 1$
$-18ac^2$

Tin a b cube ans

$abc^2 - ab^2 + 5ac^2$.
$-9abc^2 + 6ab^2 - 8ac^2$

$-8abc^2 + 5^2abc^2 - 8ac^2$

$8a^2b^2 - 7a^2b + 5ab$
$-9a^2b^2 + 9a^3b + 8ab$

$-8a^2b^2 + 2a^3b + 8ab$

$3ab^4 - 7a^3c^2b^3 - 6a^4b^5 -$
$-8ab^4 + 6a^3c^2b^3 + 6a^4b^5 -$
$-6ab^4 \quad + 2a^4b^5 -$

$-6ab^4 - a^3c^2b^3$

11

$19\frac{1}{2}$

$2\overline{)39}$

6 1

$\frac{1}{2} + \frac{3}{4}$

$\frac{2}{4}$ $\frac{5}{4} \times \frac{1}{2}$

$\frac{5}{8}$ 2 $\frac{5}{8}$ $\frac{5}{8}$



$18\frac{10}{16}$

18
16
2

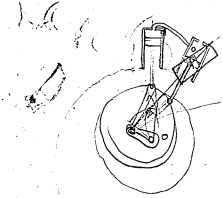
13
2 0 5
1 0
22
16

110
16
16 | 110
96
14

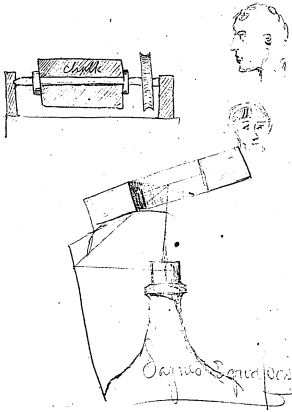
Chalk

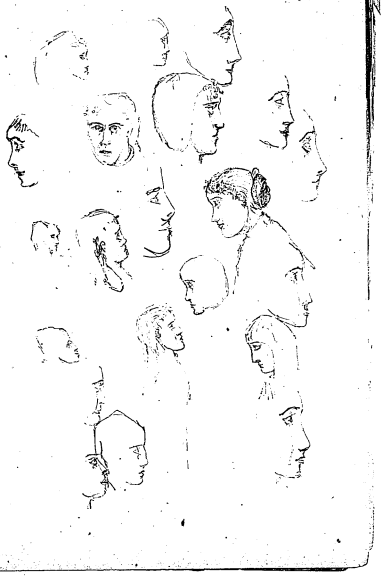
Edison's Chalk Cylinders No 1

for 80 gr. chalk feed - 30 cu. centimetres of $H_2$ Each chalk weighs 1.33 gr.









Working Drawings for Lathe 35

Timber 3 x 4

fly wheel 2 ½ inches

height - 25.5 fly wheel

Length top 36 in Width 24 in

height 34 inches

34 - 2 = 32 / 4

36 - 25 = 11

178

179

Artistic attack Aug 30 1880

indifference

Cold

Practical

Sarcasm

Sentimental

Dec. 91. Bored

A. B. Merrick

Menlo Park N. J.

Gladstone

Gravity

Gravity

Stern & Tunnel

Inverness

London W.C.



I am the great I am

Unfaithfulness

Faithfulness

You must certainly of made a mistake on your answer to a correspondent on your own Thurs. day You said at the end of the answer that Yes ~~[illegible]~~ whether two horses over tied together a foot over the same or two four horses or one hanging to that

Yours A. B. Merrick

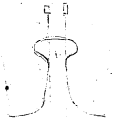
A. B. M.

A. B. Merrick

A. B. Merrick

Allen



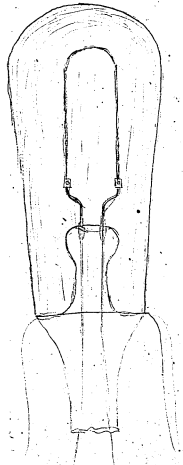


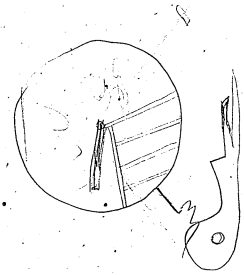
Ernest Bergmann



X — 140 / 76.07

2.146128
4.851289







have little tubes 1/16 of
and with apart- inside of work
a light elec magnet- which
are in series and as one
is magnetized it draws his tube
and changes the direction of
revolving pointer

Pituitary Gland

Conjunctival Conjunctival

192

180

2.62884
1.68124
3.18896

3. 130.968
14 132
130-21

4. 30963
130-21

301 3: 20400
78600 0435

4. 900913
0913
4.901 0643
2.638484
3.539.4933

.0435
638484
9486
33
5-3

4.634.483
4305
43605

194

195

50

52
5397938
5 3
8463D

680
90
61200

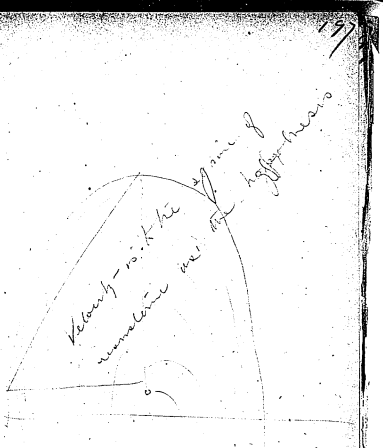
680
90

2.8921-09
1.95424 13
52.7562852

61147

61149

6325
6262
63


Velocity = 10.4 ft/sec
0

198

4746
742

3.675-412
2.870.404
6.545.816

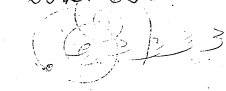
5.458.816
.5802
.14

3514
35-158
35142

5-925-
5816
109

5

4746
742
9492
18984
35221632



35-
6
R10

40/8960(99
360X
360
360X

12/150(12.50
12
30 02.00
24
6

James
July
Aug.
Sep
Oct-

61.00
54.74
8.56

57.74
15.00
1.00
1.00
54.74

James



7804
731

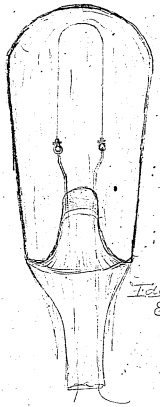
3.892317
2.863477
6.756284
.6150
1.54

5704477
E294
625-6
38

7804
731
7804
2841 2
5546 28
5704724

,51

21-4.50
12.50
1.50
1.50

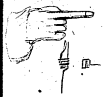


Edisons
Electric Lamp
Oct 12 1880

206

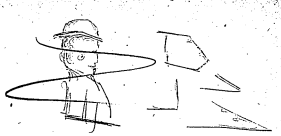
$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$

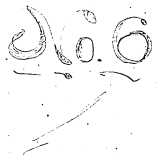
$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ Equal



Denver

Pat. by Edison July 23 1880
from this bottle





Mosby Henry Cary



6.9427 52
20
15
6.11
6.9427 1.846

136 / 76804 =

4.885361
2.135-89

4.885361
5-5-
5-65-7
4.885-103

4.885384
2.133589
2.755.1845

136 / 76804 (5-64
680
8840 3
816
824
604
40

401 / 39 8 Gal

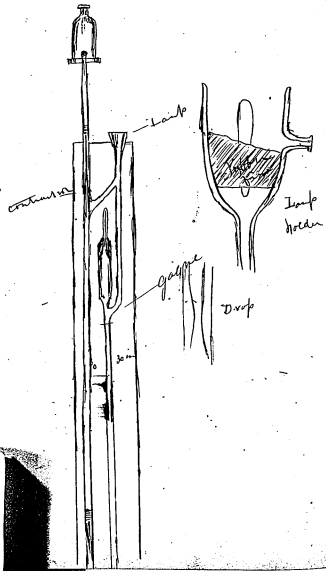
2. 60 31 44
4. 59 94 57

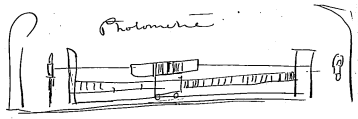
399446
11
599457

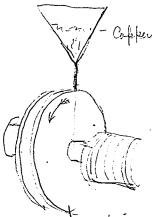
45 99 44 57

Del

June 2 1881 Notes to 608
to be presented in reference


Lamp
Lamp Holder
gauge
Drop
3cm


Photometer




Lead pieces recovering at sides. Few sec. and clump in the copper particles out of the ordinary path of projection

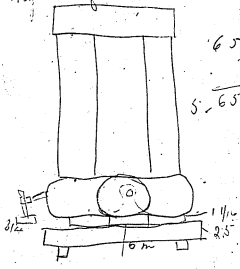
Bridle Fuels Magnets 53.7519
8574
54488

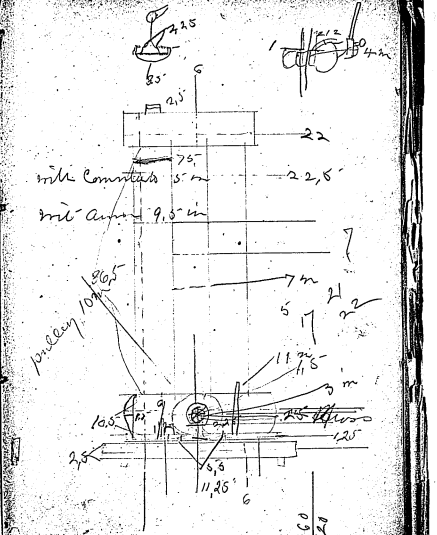
Total height

height of stand from ground

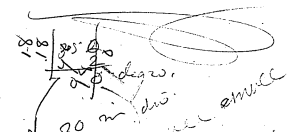
thigh of brace 03.37 x

65.5810
.17
9
5.65588.96




2,25
5,5
2,5
22
mit Contrepoids 5 m
22,5
mit aigue 9,5 m
7 m
Poulie 10 m
11,25
3 m
10,5
1,25
2,5
6
11,25
3860
120

Gal from scale 25 in
Indian scale 1.8 in


18
18
25
90 degrs.
30 m. dia.
Outer small gall
1.5 m. dia.
Rix
1.8 :: 25
1.5 m. dia.
170° Web
81 dry diff.
Web
Web
25
1.5
10 m. dia.
10 m. dia. in
25
1.5
25
1.8
25
1.8
25
1.8

$\frac{18}{10}$ Jobs -

$\frac{10}{18}$

10.8 Ohms are Cir

R Battery Gen 13

R D.C. 9

Indirect free molecular

Z ∇ I

$\mp = \frac{13 + 9 + \text{in}}{c}$ $\mp$ See Page 114

$c = \mp(13 + 9 + \text{in})$ $\Delta = 10$

= 100% Pow. $\frac{9}{10}$ 118 /

$\mathcal{R} = 18 = 5$ c/s Pow 118 Ohms

$\mp = \frac{100 + 8 + 10}{c}$

$\mp = \frac{100 + 8 + \sqrt{}}{c}$ Mf. 18°

$R = \frac{450}{48} - 100\% + 8\%$ $\frac{9}{18}$ 100%

279

$R = C(R + \Delta)$

$T + R\sin\theta = C(R + \Delta)$

90
6
720
4
2880

60° = 2880 chains

20° = 960 chains

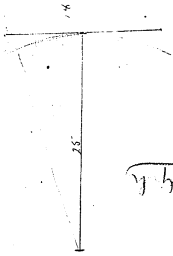
10° = 480 chains

40° = 1920 chains

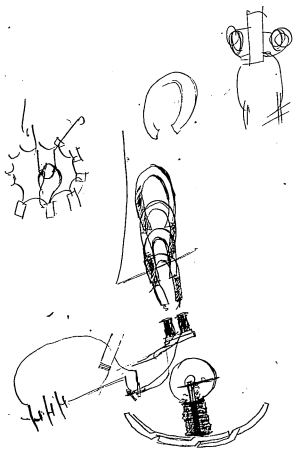
10.5 chains

Near Heron

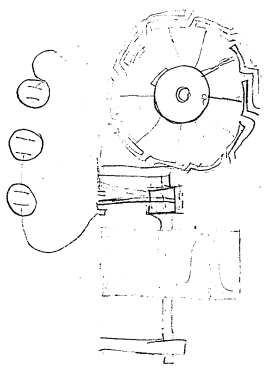
5. 65-5810
77
9.6
5. 655896




Glen Hawk Rd



2268



Bob Richard to Russell

A. B. Merrick

Walking

Walking

Washington Walking

Mary one son came

Saddle ON.p

Saddle

6.942752

20

1.5

.1

6.9427752

2345687

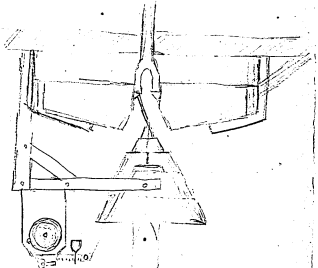
5.3702187

381

1.D

5.3702187

5.3702187



864201

5.936614 Log
90
.5
5.936619 Con

2. 5.38574 = 0.602660
1,740363
7.861797

1.88 123/876

0 1944.275 = .08333
.94384
1.14761

0.876143

1.091815

.005678

-5.936619 Log

2 of